

## CURRICULUM VITAE FOR ANDERS BJÖRKLUND

Born on July 11, 1945 in Söderhamn, Sweden.

*Current position:* Senior Professor of Histology, Wallenberg Neuroscience Center, Lund University, Sweden

Web site: [www.wnc.se](http://www.wnc.se)

### Education:

1964-1967 Medical school, Lund  
1966-1969 Doctor of Medicine (Medical Sciences), PhD in histology  
1970 Docent of histology at the University of Lund

### Appointments:

*At Lund University, Lund, Sweden:*

1966-69 Assistant teacher  
1969-71 Research associate  
1971-72 Docent  
1973-83 Associate Professor of Histology (Lektor)  
1983 Professor of Histology  
1996-2012 Section Chief at Wallenberg Neuroscience Center, Lund University  
2012- Appointment as Senior Professor at the faculty of medicine, Lund University

*Abroad:*

April 1985 Visiting Professor at the College de France, Paris  
1989-90 Newton-Abraham Visiting Professor at the University of Oxford, England

### Scientific publications

About 675 publications in the fields of neuroanatomy, neuronal regeneration, cell transplantation and repair in the central nervous system.

*h*-index: 145 (Scopus) 165 (Google Scholar); total citations: 63875 (Scopus) 83260 (Google Scholar), as of March 2020, using “Bjorklund A” and “Lund” as search items.

### Commissions of Trust

- European Neuroscience Association: President 1996–1998
- Royal Swedish Academy of Sciences: Chairman of the Medical Class 1995-2000
- Wellcome Trust, UK: Neurosciences Panel Member 2004-2006
- Parkinson’s Disease Society, UK: Panel Member 2007-2009
- Michel J Fox Foundation, New York: Member of the Scientific Advisory Board and/or Executive committee 2004-2014.
- European Research Council, Brussels: Chairman of the Neurosciences Panel 2007-2010
- Member of the Scientific Advisory Board of the Neuroscience Center at Helsinki University 2002-.
- Swedish Research Council, Stockholm: Panel Member 2016-2018.
- Wallenberg Academy Fellows Committee of the Royal Swedish Academy of Sciences, Stockholm: 2011-.
- The Brain Prize, Copenhagen: Member of the Board 2010-2015, Member of the Selection Committee 2015-2017, Chairman 2017-2019.
- Member of the HiLIFE Scientific Council at Helsinki University 2017-2019.
- Member of Biogen’s Q2 Scientific Advisory Board 2018-
- Member of the panel LS5, Neuroscience, for the evaluation of ERC Starting Grants 2020

## **Honors**

- Doctor Honoris Causa, University of Turin, Italy 1987
- Doctor Honoris Causa, University of Copenhagen, Denmark 1989
- Master of Science, University of Oxford, 1989
- Member of the Royal Swedish Academy of Sciences since 1989
- Lifetime Fellow of Clare Hall College, Cambridge, UK since 1999
- Foreign Associate of the National Academy of Sciences, USA, since 2011

## **Lectureships and Awards**

- The Wakeman Award from Duke University, NC, USA, 1984 (with L Olson and U Stenevi)
- Brooks Lecturer at the Harvard Medical School, November 1986
- Presidential Lecturer, Society for Neuroscience annual meeting, Toronto, 1988
- Presidential Lecturer, European Neuroscience Association meeting, Turin, 1989
- The Zulch Prize from the Max-Planck Society, Germany, 1990 (with Lars Olson)
- The Göran Gustafsson Prize and Award from the Swedish Academy of Sciences, 1990
- The IPSEN Prize in Neuronal Plasticity from the IPSEN Foundation, Paris, 1990 (with Albert Aguayo and Fred H. Gage)
- The International Cajal Medal and Award from The Cajal Institute, Madrid, Spain, 1991
- Lars Leksell Lecturer, University of Virginia, Charlottesville, VA, 1992
- Decade of the Brain Lecturer, American Academy of Neurology, San Diego, 1992
- The Charles A. Dana Award from the Dana Foundation, New York, 1993 (with F. H. Gage)
- The Jubilee Medal Prize from the Swedish Society for Medicine, Stockholm, 1993
- The Koester Memorial Lectureship and Award, University of Zürich, Switzerland, 1995
- Decade of the Brain Lecture, Brain Research Association, London, 1995
- The Anders Jahre Prize for Medical Research from Oslo University, Norway, 1995 (with L Olson)
- The Stanley Fahn Lecturer, The Movement Disorders Society Meeting, New York, 1998
- The Söderberg Prize for Medical Research from the Swedish Society for Medicine, Stockholm, 2000 (with Olle Lindvall)
- William H. Sweet Lecturer, Massachusetts General Hospital, Boston, October 2002
- Presidential Lecturer, Society for Neuroscience Annual Meeting, Orlando, Fla, Nov. 2002
- The Van Wagenen Lecture, American Association for Neurological Surgeons, May 2004
- The Charles Sherrington Lecture, University of Liverpool, Nov 23, 2004
- The Ragnar Granit Lecture in Neuroscience, Karolinska Institutet, Stockholm, Nov. 25, 2004
- The Wendell JS Krieg Lifetime Achievement Award from the Cajal Club, June 2006
- Lundbeck Foundation Nordic Award for Outstanding Research, Copenhagen, March 2007
- The Sven Berggren Prize from the Royal Physiographic Society, Lund, October 2008
- The Van Wagenen Lecture, American Association for Neurological Surgeons, May 2009
- The Robert A Pritzker Prize from the Michael J Fox Foundation, June 2011.
- The Eric K Fernstrom Nordic Prize from Lund University, November 2011.
- Helis Foundation Award for Parkinson's Disease and Neurodegenerative research at Johns Hopkins University, Baltimore, September 2013
- European College of Neuropharmacology (ECNP) Neuropsychopharmacology Award, October 2013
- The Camillo Golgi Medal of the University of Brescia, Italy, October 2016.

**Theses of graduate students examined under my main supervision:**  
(current activity in brackets)

- Ulf Stenevi (1973) (Emeritus Professor of Ophthalmology, Göteborg University)
- Anders Nobin (1973) (Docent Surgery; diseased 1987)
- Hans-Georg Baumgarten (1973) (Professor of Anatomy, Freie Universität, Berlin; now retired)
- Olle Lindvall (1974) (Professor of Neurology, Lund University Hospital)
- Bo Bjerre (1974) (Practising physician, Borlänge, Sweden)
- Niels-Aage Svendgaard (1975) (Professor of Neurosurgery, Karolinska Hospital, now diseased)
- Kjeld Møllgård (1979) (Prof. of Anatomy, Copenhagen; Rector Copenhagen Univ. 1995-2001)
- Leif Wiklund (1979) (Överläkare, Dept of Clinical Genetics, Uppsala University)
- Ingemar Lorén (1981) (Överläkare, Dept of Radiology, Malmö University Hospital)
- Gunnar Skagerberg (1984) (Neurosurgeon, Lund University Hospital)
- Ole Isacson (1987) (Professor, Harvard Medical School, Boston)
- Patrik Brundin (1988) (Professor and Director, Van Alden Institute, Grand Rapids, USA)
- Peter Kalén (1988) (Hand Surgeon, Malmö University Hospital)
- Klas Victorin (1990) (Överläkare, Dept of Neurology, Lund University Hospital)
- Ola G. Nilsson (1990) (Chief of Clinic, Dept of Neurosurgery, Lund University Hospital)
- Walter Fischer (1991) (Neurosurgeon, Rigshospitalet, Copenhagen, Denmark)
- Angela Cenci-Nilsson (1993) (Professor, of Neuroscience, Lund University)
- Guido Ninkovic (1994) (Professor of Neurosurgery, University of Erlangen, Germany)
- Kenneth Campbell (1994) (Professor, University of Cincinnati, Cincinnati)
- Hansjörg Sauer (1995) (Senior scientist, Guildford Pharmaceuticals, Baltimore)
- Cecilia Lundberg (1996) (Professor, Wallenberg Neuroscience Center, Lund University)
- Giampiero Leanza (1996) (Associate professor, University of Trieste, Italy)
- Martin Olsson (1997) (Neurosurgeon, Karolinska Hospital, Stockholm)
- Carl Rosenblad (1999) (Neurologist, Lund University Hospital)
- Deniz Kirik (2001) (Professor, Lund University)
- Christian Winkler (2002) (Chief Neurologist, University of Hannover, Germany)
- Ulrica Englund (2002) (Lektor, Lund University; Joint supervision with K. Victorin)
- Malin Parmar (2003) (Professor, Lund University, Joint supervision with K. Campbell)
- Biljana Georgievska (2004) (Researcher, AstraZeneca, Södertälje)
- Elin Andersson (2005) (Researcher, Lund University Hospital)
- Thomas Carlsson (2007) (Researcher, Göteborg University)
- Josephine Hebsgaard (2008) (Research scientist, Novo Nordisk A/S, Köpenhamn)
- Marie Jönsson (2009) (Staff Scientist, Lund University)
- Shane Grealish (2012) (Medical school, Oxford, UK)

### Postdoctoral fellows:

A total of about 50 postdoctoral scientists have worked in my lab over the years. Some have developed into recognized leaders in their fields, such as Prof Fred H Gage (Salk Institute, La Jolla, USA) and Stephen B Dunnett (Cardiff University, UK).

### Selected publications (of a total of about 675):

- Björklund, A.**, Stenevi, U., Svendgaard, N-A. (1976) Growth of transplanted monoaminergic neurons into the adult hippocampus along the perforant path. *Nature* 262: 787-790.
- Björklund, A.**, Stenevi, U., Dunnett, S.B., Iversen, S.D.: Functional reactivation of the deafferented neostriatum by nigral transplants. *Nature* 289:497-499, 1981.
- Björklund, A.**, Stenevi, U., Dunnett, S.B., Gage, F.G. (1982) Cross-species neural grafting in a rat model of Parkinson's disease. *Nature* 298: 652-654.
- Low, W.C., Lewis, P.R., Bunch, S.T., Dunnett, S.B., Thomas, S.R., Iversen, S.D., **Björklund, A.**, Stenevi, U. (1982) Functional recovery following neural transplantation of embryonic septal nuclei in adult rats with septohippocampal lesions. *Nature* 300: 260-262.
- Fray, P.J., Dunnett, S.B., Iversen, A., **Björklund, A.**, Stenevi, U. (1983) Nigral transplants reinnervating the dopamine-depleted neostriatum can sustain intracranial self-stimulation. *Science* 219: 416-419.

- Gage, F.H., Dunnett, S.B., **Björklund, A.**, Stenevi, U. (1983) Aged rats: recovery of motor coordination, impairments by intrastriatal nigral grafts. *Science* 221: 966-969.
- Isacson, O., Brundin, P., Kelly, P.A.T., Gage, F.H., **Björklund, A.** (1984) Functional neuronal replacement by grafted striatal neurones in the ibotenic acid-lesioned rat striatum. *Nature* 311: 458-460.
- Gage, F.H., **Björklund, A.**, Stenevi, U., Dunnett, S.B., Kelly, P.A.T. (1984) Intrahippocampal septal grafts ameliorate learning impairments in aged rats. *Science* 225: 533-536.
- Isacson, O., Dunnett, S.B., **Björklund, A.** (1986) Graft-induced behavioral recovery in an animal model of Huntington's disease. *Proc.Natl.Acad.Sci.* 83: 2728-2732.
- Williams, L.R., Varon, S., Peterson, G.M., Wictorin, K., Fischer, W., **Björklund, A.**, Gage, F.H. (1986) Continuous infusion of nerve growth factor prevents basal forebrain neuronal death after fimbria-fornix transection. *Proc.Natl.Acad.Sci.* USA 89: 931-9235.
- Fischer, W., Wictorin, K., **Björklund, A.**, Williams, L.R., Varon, S., Gage, F.H. (1987) Amelioration of cholinergic neuron atrophy and spatial memory impairment in aged rats by nerve growth factor. *Nature* 329: 65-68.
- Lindvall, O., Brundin, P., Widner, H., Rehnström, S., Gustavii, B., Frackowiak, R., Leenders, K.L., Sawle, G., Rothwell, J.C., Marsden, C.D., **Björklund, A.** (1990) Grafts of fetal dopamine neurons survive and improve motor function in Parkinson's disease. *Science* 247:574-577.
- Wictorin, K., Brundin, P., Gustavii, B., Lindvall, O., **Björklund, A.** (1990) Reformation of long axon pathways in adult rat central nervous system by human forebrain neuroblasts. *Nature* 347:556-558.
- Widner, H., Tetrad, J., Rehnström, S., Snow, B., Brundin, P., Gustavii, B., **Björklund, A.**, Lindvall, O., Langston, J.W. (1992) Bilateral fetal mesencephalic grafting in two patients with parkinsonism induced by 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP). *New Engl.J.Med.* 327: 1556-1563.
- Martinez-Serrano, A., Fischer, W., **Björklund, A.** (1995) Reversal of age-dependent cognitive impairments and cholinergic neuron atrophy by NGF-secreting neural progenitors grafted to the basal forebrain. *Neuron*, 15: 473-484.
- Martinez-Serrano, A., Fischer, W., Söderström, S., Ebendal, T., **Björklund, A.** (1996) Long-term functional recovery from age-induced spatial memory impairments by nerve growth factor gene transfer to the rat basal forebrain. *Proc Natl Acad Sci, USA*, 93: 6355-6360.
- Sauer, H., Rosenblad, C., **Björklund, A.** (1996) GDNF but not TGF- $\beta$ 3 prevents delayed degeneration of nigral dopaminergic neurons following striatal 6-hydroxydopamine-lesion. *Proc Natl Acad Sci, USA*, 92: 8935-8939.
- Picini P, Brooks DJ, **Björklund A**, Gunn RN, Grasby PM, Rimoldi O, Brundin P, Hagell P, Rehnström S, Widner H, Lindvall O (1999) Dopamine release from nigral transplants visualized in vivo in a Parkinson's patient. *Nature Neurosci* 2:1137-1140.
- Picini P., Lindvall O., **Björklund A.**, Brundin P., Hagell P., Ceravolo R., Oertel W., Quinn N., Samuel M., Rehnström S., Widner H., and Brooks D. J. (2000) Delayed recovery of movement-related cortical function in Parkinson's disease after striatal dopaminergic grafts. *Ann Neurol.* 48, 689-695.
- Kirik, D., Georgievskia B, Burger C, Winkler C, Muzyczka N, Mandel R and **Björklund A.** (2002) Reversal of motor impairments in Parkinsonian rats by continuous intrastriatal delivery of L-DOPA using AAV-mediated gene transfer. *Proc. Natl. Acad. Sci.*, 99: 4708-13.
- Kirik D, Rosenblad C, Burger C, Lundberg C, Johansen TE, Muzyczka N, Mandel RJ, **Björklund A.** (2002) Parkinson-like neurodegeneration induced by targeted overexpression of alpha-synuclein in the nigrostriatal system. *J Neurosci.* 22:2780-91.
- Kirik, D, Annett, LE, Burger, C, Muzyczka, N, Mandel, RJ, **Björklund A** (2003) Nigrostriatal a-synucleinopathy induced by viral vector-mediated overexpression of human a-synuclein: A new primate model of Parkinson's disease. *Proc Natl Acad Sci U S A.* 100:2884-2889.
- Picini P, Pavese N, Hagell P, Reimer J, **Björklund A.** Oertel WH, Quinn NP, Brooks DJ, Lindvall O. (2005) Factors affecting the clinical outcome after neural transplantation in Parkinson's disease. *Brain.* 128(Pt 12):2977-86.
- Carta M, Carlsson T, Kirik D, **Björklund A** (2007) Dopamine released from 5-HT terminals is the cause of L-DOPA-induced dyskinesias in parkinsonian rats. *Brain*, 130: 1819-1833.
- Li JY, Englund E, Holton JL, Soulet D, Hagell P, Lees AJ, Lashley T, Quinn NP, Rehnström S, **Björklund A.**, Widner H, Revesz T, Lindvall O, Brundin P. (2008) Lewy bodies in grafted neurons in subjects with Parkinson's disease suggest host-to-graft disease propagation. *Nature Medicine* 14(5):501-3.
- Thompson LH, Grealish S, Kirik D, **Björklund A.** (2009) Reconstruction of the nigrostriatal dopamine pathway in the adult mouse brain. *Eur J Neurosci.* Aug;30(4):625-38. Epub 2009 Aug 10.
- Grealish S, Jönsson ME, Li M, Kirik D, **Björklund A.**, Thompson LH. (2010) The A9 dopamine neuron component in grafts of ventral mesencephalon is an important determinant for recovery of motor function in a rat model of Parkinson's disease. *Brain.* 2010 Feb;133(Pt 2):482-95. Epub 2010 Jan 31.

- Li JY, Englund E, Widner H, Rehnrcrona S, **Björklund A**, Lindvall O, Brundin P. (2010) Characterization of Lewy body pathology in 12- and 16-year-old intrastriatal mesencephalic grafts surviving in a patient with Parkinson's disease. *Mov Disord.* 2010 25:1091-1096
- Politis M, Wu K, Loane C, Quinn NP, Brooks DJ, Rehnrcrona S, **Bjorklund A**, Lindvall O, Piccini P (2010) Serotonergic neurons mediate dyskinesia side effects in Parkinson's patients with neural transplants, *Sci Transl Med.* 2010 Jun 30;2(38):38-46.
- Decressac M, Ulusoy A, Mattsson B, Georgievska B, Romero-Ramos M, Kirik D, **Björklund A**. (2011) GDNF fails to exert neuroprotection in a rat  $\alpha$ -synuclein model of Parkinson's disease. *Brain.* Aug;134(Pt 8):2302-11.
- Lundblad M, Decressac M, Mattsson B, **Björklund A**. (2012) Impaired neurotransmission caused by overexpression of  $\alpha$ -synuclein in nigral dopamine neurons. *Proc Natl Acad Sci U S A.* Feb 28;109:3213-9.
- Decressac M, Kadkhodaei B, Mattsson B, Laguna A, Perlmann T, **Björklund A** (2012)  $\alpha$ -Synuclein-Induced Down-Regulation of Nurr1 Disrupts GDNF Signaling in Nigral Dopamine Neurons. *Science Transl Med.* Dec 5;4(163): 163ra156.
- Decressac M, Mattsson B, Weikop P, Lundblad M, Jakobsson J, and **Björklund A** (2013) TFEB-mediated autophagy rescues midbrain dopamine neurons from  $\alpha$ -synuclein toxicity. *Proc Natl Acad Sci, USA*, May 7;110(19):E1817-26. doi: 10.1073.
- Kefalopoulou Z, Politis M, Piccini P, Mencacci N, Bhatia K, Jahanshahi M, Widner H, Rehnrcrona S, Brundin P, **Björklund A**, Lindvall O, Limousin P, Quinn N, Foltynie T. (2013) Long-term Clinical Outcome of Fetal Cell Transplantation for Parkinson Disease: Two Case Reports. *JAMA Neurol.* 2013 Nov 11.
- Grealish S, Diguët E, Kirkeby A, Mattsson B., Heuer A., Bramoule Y., Van Camp N, Perrier A.L., Hantraye P., **Björklund A**, Parmar M (2014) Human ESC-Derived Dopamine Neurons Show Similar Preclinical Efficacy and Potency to Fetal Neurons when Grafted in a Rat Model of PD. *Cell Stem Cell* **15**, 653-665.
- Grealish S, Heuer A, Cardoso T, Kirkeby A, Jönsson M, Johansson J, **Björklund A**, Jakobsson J, Parmar M. (2015) Monosynaptic Tracing using Modified Rabies Virus Reveals Early and Extensive Circuit Integration of Human Embryonic Stem Cell-Derived Neurons. *Stem Cell Reports.* 2015 ;4(6):975-83.
- Thompson LH, **Björklund A**. (2015) Reconstruction of brain circuitry by neural transplants generated from pluripotent stem cells. *Neurobiol Dis.* 79:28-40. doi: 10.1016/j.nbd.2015.04.003. Review
- Volakakis N, Tiklova K, Decressac M, Papathanou M, Mattsson B, Gillberg L, Nobre A, **Björklund A**, Perlmann T. (2015) Nurr1 and Retinoid X Receptor Ligands Stimulate Ret Signaling in Dopamine Neurons and Can Alleviate  $\alpha$ -Synuclein Disrupted Gene Expression. *J Neurosci.* 35(42):14370-85.
- Li W, Englund E, Widner H, Mattsson B, van Westen D, Lätt J, Rehnrcrona S, Brundin P, **Björklund A**, Lindvall O, Li JY. (2016) Extensive graft-derived dopaminergic innervation is maintained 24 years after transplantation in the degenerating parkinsonian brain. *Proc Natl Acad Sci U S A.* 2016 May 2. pii: 201605245.
- Björklund A**, Lindvall O. (2017) Replacing Dopamine Neurons in Parkinson's Disease: How did it happen? *J Parkinsons Dis.* 7(s1):S23-S33.
- Thakur P, Breger LS, Lundblad M, Wan OW, Mattsson B, Luk K, Lee VMY, Trojanowski JQ, **Björklund A** (2017) Modeling Parkinson's disease pathology by combination of fibril seeds and  $\alpha$ -synuclein overexpression in the rat brain. *Proc Natl Acad Sci U S A.* Sep 26;114(39):E8284-E8293.
- Cardoso T, Adler AF, Mattsson B, Hoban DB, Nolbrant S, Wahlestedt JN, Kirkeby A, Grealish S, **Björklund A**, Parmar M. (2018) Target-specific forebrain projections and appropriate synaptic inputs of hESC-derived dopamine neurons grafted to the midbrain of parkinsonian rats. *J Comp Neurol.* Jul 14.
- Faustini G, Longhena F, Varanita T, Bubacco L, Pizzi M, Missale C, Benfenati F, **Björklund A**, Spano P, Bellucci A (2018) Synapsin III deficiency hampers  $\alpha$ -synuclein aggregation, striatal synaptic damage and nigral cell loss in an AAV-based mouse model of Parkinson's disease. *Acta Neuropathol.* 2018 Jul 25.
- Björklund A**, Dunnett SB. (2019) The Amphetamine Induced Rotation Test: A Re-Assessment of Its Use as a Tool to Monitor Motor Impairment and Functional Recovery in Rodent Models of Parkinson's Disease. *Journal of Parkinson's Disease* 2019 9:17-29.
- Rosenblad C, Li Q, Pioli EY, Dovero S, Antunes ASLM, Agúndez L, Bardelli M, Linden RM, Henckaerts E, **Björklund A**, Bezard E, Björklund T. Vector-mediated l-3,4-dihydroxyphenylalanine delivery reverses motor impairments in a primate model of Parkinson's disease. *Brain.* 2019 Jun 26
- Adler, A.F., Cardoso, T., Nolbrant, S., Mattsson, B., Hoban, D.B., Jarl, U., Wahlestedt, J.N., Grealish, S., **Bjorklund, A.**, and Parmar, M. (2019). hESC-Derived Dopaminergic Transplants Integrate into Basal Ganglia Circuitry in a Preclinical Model of Parkinson's Disease. *Cell Rep* 28, 3462-3473 e3465.
- Adler AF, **Björklund A**, Parmar M. Transsynaptic tracing and its emerging use to assess graft-reconstructed neural circuits. *Stem Cells.* 2020 Feb 26
- Hoban DB, Shrigley S, Mattsson B, Breger LS, Jarl U, Cardoso T, Nelander Wahlestedt J, Luk KC, **Björklund A**, Parmar M. Impact of  $\alpha$ -synuclein pathology on transplanted hESC-derived dopaminergic neurons in a humanized  $\alpha$ -synuclein rat model of PD *Proc Natl Acad Sci, USA*, in press.